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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Xiangxin Bi

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MINNEAPOLIS, MN 55402

EXAMINER

STOUFFER, KELLY M

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

04/11/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 09/715,935	Applicant(s) BI ET AL.	
	Examiner KELLY STOUFFER	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18,20-38 and 62-73 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 33-38 and 71-73 is/are allowed.
- 6) ☒ Claim(s) 18,20-28 and 62-70 is/are rejected.
- 7) ☒ Claim(s) 29-32 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/31/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6 February 2008 has been entered.

Response to Arguments

Applicant's arguments filed 6 February 2008 and 3 March 2008 have been fully considered but they are not persuasive. The applicant argues that the combination of Thaler and Whitney does not include a precursor stream comprising a metal or metalloid precursor. However, in Thaler (further described below) use of a metal or metalloid dopant is discussed in columns 5, 6, 8 and 11, et seq. As to the previous arguments regarding the combination of Thaler and Whitney, , the applicant argues that using the apparatus of Thaler in the Whitney apparatus renders the Whitney apparatus unusable. However, the rejection is made over Thaler in view of Whitney. Thaler does not include moving the substrate relative to the flow of the product stream but does describe a desire to coat large substrates (column 9 lines 34-53). Whitney et al. teaches moving the substrate relative to the product stream (column 7 lines 41-48).

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One of ordinary skill in the art would recognize that allowing the substrate to move would coat larger substrates more easily, and in addition, all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention. See *KSR International Co. v. Teleflex Inc.*, 550 U.S.--, 82 USPQ2d 1385 (2007). Further, Allen et al. (*J. Vac. Sci. Technol.*, 16(2), Mar/Apr 1979) teaches that films such as that practiced by the instant invention and prior art using laser assisted CVD are self limiting. One of ordinary skill in the art would necessarily have to move the substrate or the laser beam in order to coat larger substrates than the diameter of the laser beam.

Also, though Thaler uses the energy beam to enact either a physical or chemical change on the reactants and Whitney et al. uses the energy beam to melt the reactants (abstract), it would be readily apparent to one of ordinary skill in the art that the chemical or physical change depends upon the reactants used. This is additionally supported by the instant specification, page 23. New grounds of rejection appear below to reflect the addition support of Allen et al.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 18, 20, 22-28, 62 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thaler (US Patent 5547716) in view of Whitney et al. (US Patent 5043548) and in further view of Allen et al. (*J. Vac. Sci. Technol.*, 16(2), Mar/Apr 1979).

Regarding claim 18, Thaler discloses a method of coating a substrate comprising reacting a reactant stream within a flow (see Figures) by directing a light beam at the reactant stream to produce within the flow a product stream comprising particles

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downstream from the radiation beam, or at least the effective area of the light beam, wherein the particles are produced by a chemical reaction driven by the light beam and the flow passes through the radiation beam and is directed towards a substrate (columns 8-9 lines 62-25) and the light beam does not intersect the substrate (Figure 13). Thaler includes a metal or metalloid dopant in the reactant stream from the heated substrate, or analogously, the sacrifice 92, in column 5 lines 23-38, column 8 lines 62-column 9 lines 6, and column 11 lines 1-28, for example. Thaler does not include moving the substrate relative to the flow of the product stream but does describe a desire to coat large substrates (column 9 lines 34-53). Whitney et al. teaches moving the substrate relative to the product stream (column 7 lines 41-48). One of ordinary skill in the art would recognize that allowing the substrate to move would coat larger substrates more easily, and in addition, all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention. See *KSR International Co. v. Teleflex Inc.*, 550 U.S.--, 82 USPQ2d 1385 (2007).

Further, Allen et al. teaches that films such as that practiced by the instant invention and prior art using laser assisted CVD are self limiting. One of ordinary skill in the art would necessarily have to move the substrate or the laser beam in order to coat larger substrates than the diameter of the laser beam. Though Thaler uses the energy beam to enact either a physical or chemical change on the reactants and Whitney et al. uses the energy beam to melt the reactants (abstract), it would be readily apparent to one of

ordinary skill in the art that the chemical or physical change depends upon the reactants used.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Thaler to include a moving substrate as taught by Whitney et al. to coat large substrates more efficiently and to obtain predictable results.

As to claim 20, the light beam is generated by a laser in Thaler (abstract).

As to claim 22, Thaler shows elongation of the reactant stream in the Figures.

Regarding claims 23, 24 and 26 the substrate may move relative to the product stream in Whitney et al. (Fig. 2 and Examples) to deposit product particles on the substrate from a reactant stream elongated in a direction along the propagation of the reactant beam or laser.

Regarding claim 25, it was determined by the examiner that the broad language of the claim encompasses removing one substrate from the apparatus, and replacing the substrate with another. It would have been obvious to one of ordinary skill in the art to achieve this as the apparatus was made to process more than one substrate in its lifetime.

Regarding claims 27 and 28, Whitney et al. also discloses that the reactant inlet or nozzle may move relative to the substrate to sweep particles across the substrate in column 7 lines 41-43 and the conduit or nozzle of Whitney et al. is shown in Fig. 2 and the reactant inlet or nozzle may move relative to the substrate to sweep particles across the substrate in column 7 lines 41-43 with the same obviousness reasoning discussed

above in reference to claim 18. Thaler additionally represents conduits and nozzles in the Figures and with their corresponding descriptions in the patent.

As to claim 62, the light beam is generated by a laser in Thaler (abstract).

As to claim 64, Thaler shows elongation of the reactant stream in the Figures.

Claims 21, 63 and 65-70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thaler, Whitney et al. and Allen et al. as described above and in further view of US Patent number 5874134 to Rao et al.

Thaler, Whitney et al. and Allen et al. include the provisions of claims 65-68 and 70 as discussed above. In addition Whitney et al. shows only depositing a layer on a portion of a substrate in Figure 2 and describes the desirability of only coating portions of the substrate in column 1 et seq. Thaler, Whitney et al. and Allen et al. do not include a substrate that may be temperature controlled with means of heating and cooling the substrate. Rao et al. teaches that the substrate may be temperature controlled by means to heat and cool the substrate in order to prevent grain growth in the deposited layer and to make the deposited layer more dense (column 4 lines 34-67 and column 7 lines 2-10).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Thaler, Whitney et al. and Allen et al. to include a substrate that may be temperature controlled with means of heating and cooling the substrate as taught by Rao et al. in order to prevent grain growth in the deposited layer and to make the deposited layer more dense.

Regarding claims 21, 63 and 69, Thaler, Whitney et al. and Allen et al. include the provisions of these claims except for pumping on the reaction chamber to maintain flow or the stream of particles. Rao et al. describes pumping a on the vacuum chamber, which one of ordinary skill in the art would have recognized as maintaining flow or a stream of particles within the chamber, to remove byproducts from the chamber (column 6 lines 50-61).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Thaler, Whitney et al. and Allen et al. to include pumping on the reaction chamber to maintain flow or a stream of particles as taught by Rao et al. in order to remove byproducts from the reaction chamber.

Allowable Subject Matter

Claims 29-32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 33-38 and 71-73 are allowed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KELLY STOUFFER whose telephone number is

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(571)272-2668. The examiner can normally be reached on Monday - Thursday 7:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kelly Stouffer
Examiner
Art Unit 1792

/Timothy H Meeks/
Supervisory Patent Examiner, Art Unit 1792